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OBESITY AND DIET (G. RAO, SECTION EDITOR)

Practical Tools for Assessing Diet Quality in Clinical Settings

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Abstract

Purpose of review Diet is closely linked to overweight/obesity and risk of cardiovascular disease. Clinical guidelines recommend behavioral counseling to promote healthy diet during clinical encounters for patients with overweight/obesity or other CVD risk factors. This review summarizes the tools available to aid clinicians in quickly assessing and addressing diet quality in clinical settings.

Recent Findings Fewer than 25% of physician office visits for adults with obesity include dietary counseling due to time constraints, lack of training in discussing nutrition with patients, and lack of resources for referral. The American Heart Association identifies rapid diet screener tools as one way to address these barriers, advocating for screeners that include clinical decision support, incorporate actionable steps for improvement, and can be integrated in electronic medical record systems. Several potentially useful tools have been developed to help clinicians without nutritional training rapidly assess patients' dietary practices and identify suggestions for change.

Summary Dietary screening and counseling in primary care can only be successful if doctors feel knowledgeable about and comfortable with giving individualized nutrition advice. While a number of validated rapid screening tools have been developed for clinical use, no single preferred tool exists; rather, clinicians should take into account the cultural preferences and dietary patterns of their patient base in selecting or adapting an appropriate screening tool. Screeners that identify actionable steps for change are key, since clinicians are unlikely to implement screening if they do not feel they can address needs or deficits that are identified.

Keywords Diet · Dietary quality indices · Decision support systems · Screening tools · Obesity

Introduction

Diet is closely linked to risk of cardiovascular disease, certain types of cancers, Alzheimer's disease, and type 2 diabetes, and the World Health Organization has identified suboptimal dietary behavior as a major modifiable determinant of chronic disease [1]. The Global Burden of Disease study estimated that 11 million deaths across 195 countries were attributable to suboptimal dietary behaviors in 2017 [2]. Americans were well below the optimal level of intake for fruits, vegetables, fiber, and whole grains, but well above recommended levels for red meat, processed meat, sugar-sweetened beverages, trans fats, and sodium. Comparative risk assessment research from Micha et al. estimated that 45% of deaths from cardiometabolic causes in the USA during 2012—more than 318,000—were associated with suboptimal diet [3].

Evidence-informed beneficial diet patterns share several key characteristics that can be incorporated into counseling in clinical care: promoting consumption of whole grains, fruits, vegetables, lean meats, and healthy fats, and limiting intake of sugar, saturated fats, and sodium [4]. In a meta-analysis of diet quality and health outcomes, Schwingshackl and colleagues found that diets that scored highly on the Healthy Eating Index (HEI) and Dietary Approaches to Stop Hypertension (DASH) scales resulted in significant reduction in the risk of all-cause mortality, cardiovascular disease, cancer, type 2 diabetes, and neurodegenerative disease [5].

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Dietary Screening in Clinical Practice

There is strong evidence that behavioral counseling can be effective in prompting dietary changes and improving health, although studies involving counseling by physicians during routine clinical encounters are lacking. In a 2020 systematic evidence review for the United States Preventive Services Taskforce (USPSTF), O'Connor et al. found that dietary counseling focused on reductions in saturated fats, sodium, and sweets/sugars and increased consumption of fruits, vegetables, and whole grains was associated with small but statistically significant reductions in continuous measures of blood pressure, low-density lipoprotein cholesterol levels, fasting glucose levels, and adiposity at 12 to 24 months' follow-up [6•]. Both USPSTF and the American College of Family Physicians recommend behavioral counseling on healthy diet for those with overweight/obesity or other CVD risk factors through either in-person counseling by primary care clinicians or referral to behavioral counseling interventions in other settings [7], but fewer than 25% of physician office visits for adults with obesity include counseling or education related to weight reduction or nutrition [8]. When dietary counseling is included in primary care, general questions about food groups or dietary patterns are the most commonly reported approach and few providers report using a standard diet questionnaire [9]. Harkin and colleagues analyzed an anonymous survey of 248 residents, fellows, and faculty in Internal Medicine and Cardiology at New York University Langone Health; only 13% believed that physicians were adequately trained to discuss nutrition with patients, yet 65% of respondents reported never or rarely referring patients to a nutritionist or registered dietitian [10•].

The American Heart Association's 2020 statement on the importance of diet to health described barriers to assessment in primary care encounters, including time constraints and competing demands for preventive counseling, lack of training on how to approach the subject and offer nutrition counseling, lack of referral options (to nutritionists, registered dietitians, weight management programs), and lack of insurance coverage [11••]. While routine dietary screening and counseling in primary care is recommended, it can only be successful if doctors know how to give individualized nutrition advice; otherwise, they need to refer patients to a registered dietitian for nutrition counseling, which can be difficult for patients to access or afford. In their editorial response to the 2020 USPSTF recommendations, Kharmats, Pilla, and Sevick suggest that primary care clinicians who are not familiar or experienced with behavior change techniques and/or lack options for referral may be unlikely to implement screening at all if they do not feel they have a way to address needs or deficits in diet that are identified [12]. The American Heart Association attempts to address these issues in its 2020 scientific statement, advocating for clinician-delivered dietary guidance using rapid diet screener tools that include clinical decision support, incorporate actionable steps for improvement, and can be tracked over time through electronic health records.

About Rapid Screening Tools

Dietary screening tools are brief instruments—generally ranging from 2 to 20 questions—that can be completed by patients prior to a clinical appointment or in waiting or exam rooms. They provide a quick means of assessing diet quality, evaluating level of adherence to a specified healthy dietary pattern or set of recommendations [13]. While a variety of tools exist, they usually reflect a common evidence-informed beneficial dietary pattern characterized by high intakes of plant-based foods such as whole grains, fruits, and vegetables and low intakes of red and processed meats, sodium, sweetened beverages, and trans-fatty acids. A focus on whole diet and patterns of consumption, rather than single foods or nutrients, is recommended [14].

Available Screening Tools

A number of short food-based screening tools have been developed to allow personnel without nutritional training to rapidly assess patients' dietary patterns. The AHA committee reviewed 15 different tools that focus on the total diet instead of single food groups or nutrients, with the goal of identifying screening tools that take less than 10 min to complete, can be used by clinicians without nutrition training, provide immediate guidance on healthy dietary changes, and can link to electronic health records to track eating habits over time [11••]. While not endorsing any specific tool, the AHA report highlights:

- Starting the Conversation tool—asks 8 questions about fruit and vegetable consumption, fast food meals, sugar-sweetened beverages, butter and fat, desserts and sweets, and servings of beans, nuts, chicken, and fish
- Rapid Eating Assessment for Patients-Shortened (REAP-S)—asks 15 questions on consumption of whole grains, fruits, and vegetables, as well as cooking and snacking habits
- Mediterranean Diet Adherence Screener (MEDAS)—asks 14 questions about consumption of healthy fats like olive oil, fruits and vegetables, fish, and red meat.

Several years before the AHA review, England and colleagues assessed 35 validated dietary assessment questionnaires for use in clinical practice [15••]. Criteria included being brief (<35 items), taking no more than 15 min to complete, being available in paper format or freely available online,

scorable without specialized software, and capable of providing immediate feedback to patients and clinicians at an individual level. The majority (20) were developed in North America. The authors reasoned that "for dietary tools to be useful in clinical practice, they need to be interpretable with minimal nutrition knowledge, quick to complete and easy to score. They must provide immediate guidance on healthy dietary changes or allow clinicians to quickly identify patients who may benefit from more intensive dietary counselling." Like the AHA committee, England et al. refrain from recommending any particular tool and suggest clinicians should select tools that have been validated for their own patient populations. They also noted that differences in study design (such as whether tools had been evaluated for clarity of language and acceptability to users or whether tools were evaluated for test-retest reliability) made direct comparison of tools difficult.

As England et al. point out, individual tools are developed in relation to local dietary guidelines and reflect local or regional dietary patterns, meaning there are barriers to applicability of validated tools to different populations. Reviews of available screening tools suggest that any diet quality survey should take into account the cultural preferences and dietary patterns of the group being surveyed, rather than applying a survey tool that refers more generally to national or international dietary recommendations or is designed for another population [13, 16]. These issues of cultural compatibility are highlighted in Rasmussen and colleagues' report on their experience in integrating the Mediterranean Diet Adherence Screener (MEDAS) into the electronic medical record at NorthShore University HealthSystem [17•]. Designed for a Spanish audience, the MEDAS penalizes those who drink ≤7 glasses of wine in a typical week in scoring and asks participants about their use of sofrito in weekly cooking—while sofrito is defined in the questionnaire, it is a staple of Mediterranean cooking and unlikely to be a typical part of the diet of the study's upper middle class Chicago patient population. Another group of Chicago-based researchers, this one at Rush University, produced an Americanized version of the MEDAS, which they called the Mediterranean Eating Patterns for Americans (MEPA) screening tool [18].

Screening tools identified by the AHA scientific statement and the review by England et al. that focused on whole diet (rather than specific dietary elements, like fat or sugar) are described in Table 1, together with a 9-item screening tool (Diet Risk Score) developed for clinical practice that was published after the AHA statement was released. Screening tools were validated against longer food frequency questionnaires and biomarkers. The table includes information on the population in which the tools were validated, to aid in decision-making about the relevance of the screening tool for use in different patient populations. It is noteworthy that the majority of screening tools are validated in primarily White, non-Hispanic populations. The table also identifies the tools that were specifically designed for use in primary care practices; a number of these tools were developed for the purpose of measuring change related to dietary interventions, rather than providing a rapid means for healthcare providers to assess dietary quality during clinical encounters, although they can be used in a clinical setting.

An Example of Incorporating a Screening Tool into Clinical Practice

Beasley et al. report on integration of a 10-item dietary screening tool into a preventive cardiology practice at New York University's Langone Health [19••]. The tool contained 1 item asking patients to rate their overall diet quality and 9 items assessing adherence to Mediterranean dietary patterns with yes/no questions about meeting recommendations regarding consumption of vegetables, fruit, whole grains, wine, fish, legumes/beans, nuts/seeds, fat, and red or processed meat. As with the original MEDAS screening tool, respondents who did not drink wine could not achieve a perfect score. The diet quality screener was integrated into the electronic health record and patients attending cardiology appointments within NYU's Prevention Center between 12/2017 and 8/2018 were asked to complete the screening tool through the electronic patient portal prior to their appointments or to do so in the waiting room. The intention was to improve efficiency by spending less time on assessment during the clinical appointment, freeing up time for counseling and discussion. Results of the screening tool were available to physicians through the EMR during appointments. A total of 868 patients completed the diet quality screener, with 80% completing the screening tool online prior to their appointments. More than half (62.1%) were overweight or obese, 18.5% reported their overall diet as fair or poor, and mean Mediterranean Diet Score (MDS) was 5.6 out of a possible 9.0. A randomly selected 190 charts were reviewed to assess physician use of the screening tool, recommendations, and referrals. References to the screening tool or subsequent counseling were mentioned in physicians' notes only 10% of the time, with no difference in mean MDS for those who received or did not receive counseling. Although a dietitian dedicated to the practice had been hired, only 22 of 865 patients (2.5%) received a dietitian referral. Despite integration of the screening tool into the EMR to increase data available to physicians and improve workflow for counseling, the rate of documented counseling and referral remained low. The authors note that demands on physicians to address multiple goals in a single visit likely impacts preventive health counseling. They also hypothesize that additional provider education on the benefits of referral to a dietitian could improve referral rates and suggest implementation of more structured guidance on when and how to use the screener, including tips for counseling.

Table 1 Short dietary quality screening tools with a whole diet focus, validated in US populations (bold indicates tools specifically designed for use in a primary care setting)

Tool name	Lead author	Validation sample characteristics				# items	Minutes to complete	Areas assessed (SSB=sugar sweetened beverages)
		% female	Race	Mean age	Mean BMI			
Diet Risk Score (DRS)	Johnston, 2020 [23]	87%	Not reported	aged 35–75	n/a	9	2	Fast food, breads, snacks, processed meats, SSB, nuts, fish, fruits, vegetables
Food Behavior Checklist	Townsend, 2003 [24]	100%	46% Black, 23% Hispanic, 21% White, 10% Asian	33	n/a	16	10–15	Fruits, vegetables, dairy, fat and cholesterol, SSB
Food Behavior Checklist-Spanish translation	Banna and Townsend, 2010 [25]	100%	100% Hispanic	36	31.1	22	15	
Healthy Eating Vital Signs (HEVS)	Greenwood, 2008 [26]	54%	77% White, 4% Black, 6% Asian, 4% Hispanic	42.6	27.7	14	n/a	Fruits, vegetables, fast foods, SSB, breakfast consumption
	Greenwood, 2012 [27]	93%	54% White, 25% Hispanic, 0 Black	38.3	68% $\geq$25.0	12	n/a	
Latino Dietary Behaviors Questionnaire	Fernandez, 2011 [28]	77%	100% Hispanic	55.2	35.4 women, 32.4 men	13	n/a	Fried foods, fats, carbohydrates, SSB, artificial sweeteners, fast food, breakfast consumption
Mediterranean Eating Patterns for Americans (MEPA)	Cerwinske, 2017 [18]	100%	Not reported	58	25.7	16	n/a	Healthy fats, fruits, vegetables, red meat and processed meat, dairy, beans, whole grains, added sugars, nuts, alcohol, fast food
National Cancer Institute's Dietary Screener Questionnaire	Thompson, 2017 [29]	n/a	Unspecified (part of 2009–2010 National Health and Nutrition Examination survey)	n/a	n/a	19	n/a	Intake of fruits, vegetables, dairy, whole grains, added sugars, SSB, calcium, dietary fiber
PrimeScreen	Rifas-Shiman, 2001 [30]	57%	63% White, 31% Black, 4% Hispanic, 1% Asian	48	27.2 women, 27.5 men	23	5	Fruits, vegetables, dairy, eggs, carbohydrates, whole grains, baked products, meats, processed meats, fish/seafood, fried foods, added salt
Rapid Eating Assessment for Patients (REAP)	Gans, 2006 [31]	57%	94% White	43.2	n/a	31	10	Vegetables, fruits, dairy, fats, fast foods/restaurants, sodium, grains
	Segal-Isaacson, 2004 [32]	44%	65% White, 21% Asian, 8% Hispanic, 6% Black	24.2	23.4	16	n/a	Vegetables, fruits, dairy, fish, poultry, meats,

Table 1 (continued)

Tool name	Lead author	Validation sample characteristics				# items	Minutes to complete	Areas assessed (SSB=sugar sweetened beverages)
		% female	Race	Mean age	Mean BMI			
Rapid Eating Assessment for Patients short form (REAP-S)								processed meats, whole grains, SSB, fried foods
Starting the Conversation	Paxton, 2011 [33]	49.8%	72% White, 15.4% Black, 1.6% Asian (21.8% Hispanic ethnicity)	58.5	34.8	8	n/a	Fruits, vegetables, fast foods, snacks, SSB, beans, chicken, fish, fats, sweets
Not specifically validated in a US population; English-language version of this Spanish screening tool was validated in a UK population								
Mediterranean Diet Adherence Screener (MEDAS)	Papadaki, 2018 [34]	66%	93% White	68.3	28.3	14	n/a	Healthy and unhealthy fats, red and processed meats, SSB, alcohol, fish and seafood, legumes, sweets and pastries, nuts

Conclusions

One value of screening is putting patients in front of a mirror and improving self-awareness, which is essential in changing behaviors. This raises the question of whether these types of screening tools have value in prompting individual change in the absence of clinician counseling. Dietary screening tools of varying complexity are readily available to the public through mobile device applications, Internet-based programs, and personal tracking devices, which in theory could be helpful in launching patient-initiated discussions with clinicians. However, for an individual to seek out and complete an online dietary assessment tool presupposes some baseline level of concern regarding one's diet and requires a level of motivation and readiness for change that many individuals of all BMI levels lack. Individuals completing screening tools on their own also face the same issues confronted by clinicians: screening results are only valuable if the user understands the meaning of the results and knows how to take action. Since face-to-face interaction with clinicians has been shown to have a greater impact on behavior than web-based dietary interventions [20–22], an approach that combines the ease and accessibility of online or mobile screening tools with the advice and guidance of trusted health providers in interpreting results and setting goals is an approach far more likely to result in health benefits.

While counseling on healthy diet in routine clinical encounters has apparent health benefits for patients and is recommended by the USPSTF and the American College of Family Physicians, concrete advice and recommendations for clinicians remains limited. A number of screening tools have been advanced to assess diet quality in clinical settings; however, they were conceptualized for varying purposes in relation to different populations, making comparisons between tools difficult. Although clinicians would like to have a straightforward answer about which tool is best, there is no single screener that fits all populations and situations, leading the USPSTF, the AHA, and others to refrain from endorsing any "one and only" tool.

Nevertheless, the AHA criteria for a good screening tool are sound and compatible with what clinicians might be looking for: a tool that is quick and easy to administer, compatible with their EMR, and provides clinical decision support with actionable steps. Despite the availability of such tools, few physicians are referring to them when they see their patients, even when support systems such as EMR-integration and practice-based nutritionists are accessible (as seen in the Langone Health study). In evidence hierarchy, studies with clinical outcomes (Patient Oriented Evidence that Matters, or POEMs) are of primary interest to clinicians. Despite the availability of many screening tools, there is little research regarding clinician-led dietary screening and counseling in primary care settings and a resultant lack of evidence showing

a direct beneficial association between using these screening tools in a clinical context and improved patient outcomes. Greater evidence to support use of brief dietary screening tools in clinical practice could lead to greater adoption by healthcare providers.

Screening tools like those described in Table 1 could be beneficial if using them initiates a cascade of events leading to brief but targeted low-intensity interventions or intermediate level interventions. While intermediate-level interventions are outside of what most clinicians can offer directly to their patients (due to lack of time, training, or other causes), having a system in place where patients who screen positive are automatically channeled toward affordable evidence-based interventions (with a dietary specialist or a special program) would encourage using the aforementioned screening tools, although lack of available resources for referral is a major barrier for many clinical practices. If relying on clinicians themselves to counsel and intervene, use of these screening tools will likely have little efficacy in promoting changes in patients' lifestyle habits if all clinicians can offer is general advice about better eating habits. In this case, screening tools that provide clinical decision support and actionable steps for improvement can help to overcome clinician hurdles to addressing dietary quality in primary care and shape conversations that are more likely to result in measurable change in patient outcomes, such as losing weight, controlling diabetes, or managing hypertension. Much like the USPSTF recommendation about screening for depression in adults, the benefit exists "in clinical practices that have adequate systems in place to ensure accurate diagnosis, effective treatment, and appropriate follow-up after screening."

Declarations

Conflict of Interest Susan Connor and Jihad Irani declare that they have no conflict of interest.

Human and Animal Rights Informed Consent This article does not contain any studies with human or animal subjects performed by either of the authors.

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